INDO AMERICAN JOURNAL OF PHARMACEUTICAL RESEARCH

BURDEN OF LEFTOVER MEDICATION AT HOME AND ITS CONTRIBUTING FACTORS IN GOBA TOWN, BALE ZONE, ETHIOPIA

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ARTICLE INFO

Article history
Received 24/01/2017
Available online
30/04/2017

Keywords
Leftover,
Contributing Factors,
Medication, Burden,
Goba.

ABSTRACT

Background: Essential medicines save lives, reduce suffering and improve health. However keeping unwanted or expired medications in house potentially exposes the family to risks. Patients may not use all the medications dispensed to them because of many reasons. Objective: The objective of this study was to assess the burden of leftover medication and its contributing factors in Goba town, Bale zone, Ethiopia, 2016. Methods: Cross sectional study design was conducted from 10th to 20th April 2016 in Goba Town. The sample size was 315 and the response rate was 95.6%. Descriptive statistics and binary and multiple logistic regression analyses were used to describe the study participants in relation to variables and to determine associated variables with the outcome. Odds ratio with 95% confidence interval was used to measure strength and significance of association. Results: Of the households visited, 82 (27.2%) had stored leftover drugs. Altogether, there were 92 leftover preparations. The average household possessed 1.12 products and the range was 1-3 per household. Housewives were 4.18 (95% CI: 1.96, 8.87) times more likely to report presence of leftover medicines than those who had other occupation; families with health professional(s) as family member were 2.8 (95% CI: 1.11, 5.71) times more likely to have leftover medicine than families with no health professional(s). Conclusion: The prevalence of leftover medicine at home in Goba town was 27.2%. Housewives with no formal job and the presence of health professional(s) in family were found to be associated with drug storage at home.

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*Please cite this article in press as **Muluneh Fromsa et al.** et al. Burden of Leftover Medication at Home and its Contributing Factors in Goba Town, Bale Zone, Ethiopia. Indo American Journal of Pharmaceutical Research.2017:7(04).*

INTRODUCTION

Background

Essential medicines save lives, reduce suffering and improve health only if they are not expired, are of good quality, safe, available, affordable and properly used. Keeping unwanted or expired medications in the house potentially exposes the family to risks such as accidental poisonings especially when the drugs are mostly not in their original containers for stability and easy identification [1].

Consumption of medicines has increased over the years due to an increase in the availability of treatment for most diseases and the growing public interest in health and health products. Medications in households lead to medication wastage which has an economic impact. Globally, unused medications cost billions of dollars [2].

Usually Patients may not use all the medications dispensed to them because of many reasons: the symptoms have been relieved, forgetfulness, dosage changes, side effect intolerance, medication reaching the expiration date, or some patients die due to life-ending morbidities while on medication [3].

In most households worldwide, medicines are kept for various purposes including emergency use and treatment of chronic or acute illnesses. These medicines are either prescribed by health professionals or obtained over-the-counter in the communities. In most communities of developing countries, there is limited knowledge among the population on the safety of drugs commonly found in homes. The medicines stored in homes are mainly obtained from drug shops, pharmacies and public health facilities [4].

A vigorous pharmaceutical drug promotion and the availability of a variety of medicines over the counter on the market makes it easy for people accessing the medicines; that is probably one reason people store medicines at home to take any time if needed for self-medication in reducing and alleviating pains and sufferings [5].

Literature Review

In previous household surveys conducted in other countries, the type, quality, storage and use of medicines in hands were studied. The studies found therapeutic duplication, medication wastages, and unnecessary hoarding of medications. About half of medicines in the households were not in current use and around 40% of these medicines were expired. In another study, nearly 25% of adults surveyed admitted to having unused medicines in their homes [6].

Many studies in Africa identified a high prevalence of drug storage at home. In Sudan, about 98% of investigated families had at least one drug product stored at home. Study conducted in Uganda also showed that about 40% of the surveyed households kept medicines at home [7].

Antibacterial (40.1%), analgesics (19.6%) and antimalarial (15.6%) drugs were the most common categories of medicines kept in households. Specifically, the following were the major drugs found in most households; paracetamol (11.8%), coartem (11.3%), amoxicillin (9.2%), metronidazole (8.2%), cotrimoxazole (10%), ciprofloxacin (2.9%) and diphenhydramine (2.6%). The majority of medicines kept in households were prescribed by self (62%), health professionals (24.3%), and drug sellers (13.4%) [4].

A systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries shows that, antimicrobial agents used in self-medication were obtained from various sources such as pharmacies, 61.8 % (21/34); leftover drugs, 41.2 % (14/34); gifts from friends/ relatives, 26.5 % (9/34), drug shops, 23.5 % (8/34) and health facilities, 26.5 % (9/34) [8].

A study conducted in Tigray, Northern Ethiopia, almost a year ago revealed that significant proportion of drugs (28%) found in the households were left over from the previous illness. Frequent drug stock outs and inaccessibility of adequate health care in developing countries like Ethiopia might be the possible explanation [7].

Statement of the Problem

The presence of medicines in households is a risk factor for irrational drug use due mainly to the easy access. This exposes patients to adverse drug effects and treatment failures [3].

According to survey conducted in Oman, the average number of medicines found per a household (6 medicines) is considered to be relatively high and a very large number of medicines (45 medicines) was found in one of the surveyed households [6].

The storage of drugs at home promotes self-medication, which may result in inadequate dosage administration, thus predisposing to incidences of drug resistance, sharing drugs with other members of family or neighbors resulting in incomplete dosage. Home stocked drugs may lose potency due to poor storage, as a result of exposure to heat, light, humidity and air. It is difficult to tell a drug has expired if the expiry dates are missing in most of the drug containers. Expired drugs pose toxicity risk as in some cases allow the active substance to undergo degradation leading to formation of toxic products [3].

Using leftovers for a later infection in the same patient carries a double risk: the subsequent pathogen may not share the susceptibility of the original; and the medication may have lost potency due to improper or prolonged storage, thus creating an environment of sub-therapeutic dosing. Similar risks are associated with sharing antibiotics with other individuals, with the additional risk of unforeseen allergic reactions [9].

Massive quantities of unused drugs in the community have been documented. For example, >204 tons of unused medicines have been collected in disposal programs in Alberta, Canada, over 8 years. Unused and expired medications are likely managed in a wide variety of ways. Hoarding expired medications in the home or giving them to friends and family may increase the risk of accidental or inappropriate ingestion [10].

Significance of the Study

The rationale of this study is to sensitize health institution, both the public and community, and other concerned bodies as a whole to understand that leftover medication at home is one of the significant public health problem and to recommend action to be taken during dispensing of medication to prevent morbidity and mortality likewise it is to promote the rational use of medication. This study will emphasize on the burden of leftover medication at home and its association with contributing factors. In addition, there is no adequate information on burden and factors leading to leftover medication at home in Goba town in particular. Hence this study aims to provide evidence-based estimates of the magnitude and burden of leftover and expired medication at home.

Many of the predisposing factors to leftover medication at home are controllable thus there is need for basic prevalence statistics to create awareness on the magnitude of leftover medication at home in our environment and also to formulate strategies to reduce its adverse health consequences in order to improve community health and reduce poor outcome.

The results from this study will reveal the magnitude of this problem in our environment and also provide relevant data to strengthen planning on the prevention of bad consequences due to leftover and expired medication at home and to reduce morbidity and mortality.

OBJECTIVES

General Objective:

To assess the burden of leftover medicine and its contributing factors in Goba town Bale zone of Oromia region South East Ethiopia, 2016

Specific Objectives

- To determine the prevalence of leftover medicine at home
- To assess the determining factors for medication leftover.
- To identify the most commonly stored medication at home.
- To identify the source of leftover medication at home.

Methods

Study Area and Period

The Study was carried out in Goba town, Bale zone of Oromia region, which is located in the south east of Addis Ababa at about 445 and 455 KMs via Assela and Shashemene respectively and 15 KM from the zone capital (Robe). It is found at the foot of Bale Mountain.

Astronomically, Goba is situated approximately at 6°58’00’’- $7^0$3’30’’N latitude and 39°56′00- $40^0$0’00’’E longitude.

The population of the town estimated to be about 44,568 in which the male to female ratio is almost 1:1 which is 22,150 and 22,418 respectively and has a household of 9285. In regard to health infrastructure there is one referral hospital and two health centers owned by the public and nine different levels clinic of private in the town. A single Pharmacy of the Red Cross and nine drug stores is serving population of town. This cross sectional study was carried out from 10th to 20th April 2016.

Study Design

A community based cross-sectional study design was used to assess the burden of leftover medication and its contributing factors in Goba Town.

Source Population and Study Population

Source Population

All households reside in Goba Town.

Study Population

The study population was households who were selected with systematic simple random sampling and interviewed within the study period.

Inclusion and Exclusion criteria

Inclusion criteria

All Households selected based on the sampling technique and who are volunteer to participate in this study were included.

Exclusion criteria

Closed houses, households with persons who are unable to communicate and seriously ill and Medication within household which were being used during data collection for both chronic and acute illness were excluded.

Sample Size and Sampling Technique /Sampling Procedures

Sample Size

The sample size was determined using the formula of sample size determination for single population proportion taking the proportion 0.28 (from previous study) [7]; with assumption of 95% confidence interval, a marginal error of 5% and additionally 10% allowance for absenteeism and refusal to participate in the study was add to the total sample size.

$$n = \frac{\left(\frac{Z_{1-\alpha}}{2}\right)^2 p(1-P)}{d^2}$$

$$n = \frac{(1.96)^2 0.28(1-0.28)}{(0.05)^2} = 310$$

Where:

n = required sample size

P = estimated population proportion

d = an absolute precision (margin of error 5%).

Since the source population is 9285 that is below 10,000 finite population correction is needed

$$Nf = \left(\frac{n}{1+\frac{n}{N}}\right) = \left(\frac{296}{1+\frac{296}{9285}}\right) = 300$$

Where:

N_f= The sample size from a finite population

N= Finite population size

n = Sample size estimation of single population proportion

Finally by adding 5% non-response rate the total sample size will be **315** Households.

Sampling Technique

Systematic Random Sampling method was applied to select study subject from all households in a town. The population profile of the town was obtained from the town Health Office and the sample size was determined after determining the sampling interval by dividing total household to the sample size ($\frac{9285}{315} = 31$). The first household was selected randomly and then every 31st of the first household was included in the survey till the required sample size reached.

Variables

Dependent Variable

- ✓ Presence of leftover medication at home

Independent Variables

- ✓ Age
- ✓ Marital status
- ✓ Family size
- ✓ Educational status
- ✓ Occupation
- ✓ Religion
- ✓ Income
- ✓ Chronic disease
- ✓ Presence of health professional in the family
- ✓ Development of Side effect
- ✓ Morbidity
- ✓ Forgetfulness
- ✓ Cure or resolution of Symptoms

Data Collection Procedures

Interviewer administered questionnaire on socio-demographic data was collected which include age, sex, etc. Similarly, the amount and type of leftover medication were recorded. The questionnaire was initially be prepared in English and then translated to Afaan Oromo and back to English by a fluent speaker of both languages to ensure its consistency. Data were collected by nurses who work at town health institutions.

Data Quality Management

To ensure the reliability and validity of the study, training was given for the data collectors, Pre-test was conducted on 20 households, 6.35% of the sample size, who were later not be included in the study sample before the actual research begins. Standard operating procedures were followed in every step of data collection and analysis of samples. Data collected using the questionnaire was checked for completeness at the end of each day. Incomplete questioners were excluded from the analysis. Double entry of data into EpiData and SPSS was used to increase the accuracy of analysis, and then analyzed.

Data Analysis Procedures

The data were cleaned, edited and checked for completeness before entering into a database. Data were entered into EpiData version 3.1 and export in to SPSS windows version 20.0. Frequency tables and charts were used to organize and present data. Bivariate analysis (chi square test) was carried out between the dependent and independent variables to determine associated factor. To control the confounding effect of other variables and to determine independent predictors of leftover and expired medication multivariable logistic regression analysis was carried out by taking those p value <0.25 in the bivariate analysis. The strength of statistical association was measured by adjusted odds ratios of 95% confidence intervals. Statistical significance was declared at P<0.05.

Ethical Consideration

The ethical clearance was obtained from Ambo University College of Medicine and Health Science Ethical Review Committee. Official permission was taken from Bale Zonal Health Department to Goba Town Health Office to conduct the study. All respondents were given detailed information about the objective of the study and informed verbal consent was obtained from each respondent prior to the data collection.

All the information collected from the study subjects was handled confidentially through omitting their personal identification and the data was used for the research purpose only.

Limitations of the study

As any cross sectional study design, cause and effect relationship will not be possible to establish for the factors dealt in the study.

RESULTS

Socio demographic characteristics

Out of 315 households participated in the study, 301 responded to all questionnaires making a response rate of 95.6%. The mean family size of the households was 4 with just above half (64.5%) of the households had at least 4 family members. Seventy seven (25.6%) and two 224 (74.4%) were males and females, respectively. Their mean age was 38.82. One hundred seventy three (57.5%), 72(23.9%), 48(15.9%), 7 (2.3%) were Orthodox, Muslim, Protestant, and catholic, respectively. One hundred sixty four (54.5%) were Oromo, followed by 119(39.5%), 10(3.3%) and 5 (1.7%) were Amhara, Tigrie, Guragie, respectively, and 3(1.0%) were other (Table1).

Table 1: Selected socio-demographic characteristics of respondents, Goba Town, South East Ethiopia, April, 2016.

Variables		Sex of Respondent		Total (n=301)
		Male (n=77) n (%)	Female (n=224) n (%)	
Age	Age 18-26	2 (2.6%)	34 (15.2%)	36 (12.0%)
	Age 27-35	23 (29.9%)	84 (37.5%)	207 (68.8%)
	Age 36 - 44	27 (35.1%)	50 (22.3%)	77 (25.6%)
	Age ≥ 45	25 (32.5%)	56 (25.0%)	81 (30.0%)
Ethnicity	Oromo	50 (64.9%)	114 (50.9%)	164 (54.5%)
	Amhara	20 (2.0%)	99 (44.2%)	119 (39.5%)
	Tigrie	2 (2.6%)	8 (3.6%)	10 (3.3%)
	Guragie.	4 (5.2%)	1 (0.4%)	5 (1.7%)
	Other	1 (1.3%)	2 (0.9%)	3 (1.0%)
	Orthodox	44 (57.1%)	129 (57.9%)	173 (57.5%)
Religion	Muslim	16 (20.8%)	56 (25.0%)	6 (2.0%)
	Protestant	12 (15.6%)	36 (16.1%)	48 (15.9%)
	Catholic	4 (5.2%)	3 (1.3%)	7 (2.3%)
	Other	1 (1.3%)	0 (0.0%)	1 (0.3%)

The majority of the respondents (61.6%) of women had no formal job and were housewives and 43(55.8%) of men were government employees. More than half of the respondents (59.5%) of the family earn greater than 2,000 Ethiopian birr, and 36(12.0%) of them earn less than 500 Ethiopian birr monthly.

Table 2: Selected socio-demographic characteristics of respondents, Goba Town, South East, Ethiopia, April, 2016.

Variables		Sex of Respondent		Total (301)
		Male (n=77) n (%)	Female (n=224) n (%)	
Occupation	Housewife	-	138 (61.6%)	138 (45.8%)
	Government Employee	43 (55.8%)	36 (16.1%)	79 (26.2%)
	Merchant	19 (24.7%)	29 (12.9%)	48 (15.9%)
	Daily laborer	3 (3.9%)	11 (4.9%)	14 (4.7%)
	Farmer	7 (9.1%)	6 (2.7%)	13 (4.3%)
	Student	5 (6.5%)	4 (1.9%)	9 (3.0%)
Monthly income in birr	≤500	1(15.6%)	35(15.6%)	36(12%)
	501-1000	8(10.4%)	52(23.2%)	60(19.9%)
	1001-1500	2(2.6%)	24(10.7%)	26(8.6%)
	1501-2000	5(6.5%)	19(8.5%)	24(8.0%)
	≥2001	61(79.2%)	94(42.0%)	155(51.5%)
Educational status of the mother	Secondary education	26 (33.8%)	89 (39.7%)	115 (38.2%)
	Tertiary education	29 (37.8%)	46 (20.5%)	75 (2.9%)
	Primary education	5 (6.5%)	37 (16.5%)	42 (14.0%)
	Illiterate	7 (9.1%)	34 (15.2%)	41 (13.6%)
	Read and write	7 (9.1%)	17 (7.6%)	24 (8.0%)
Educational status of the father	Tertiary education	49 (63.6%)	92 (41.1)	141 (46.8%)
	Secondary education	9 (11.7%)	53 (23.7)	62 (20.6%)
	Primary education	6 (7.8%)	17 (7.6)	23 (7.6%)
	Illiterate	4 (5.2%)	9 (4.0)	13 (4.3%)
	Read and write	5 (6.5%)	4 (1.9)	9 (3.0%)
Marital status	Married	71 (92.2%)	170 (75.9%)	241 (80.1%)
	Divorced	2 (2.6%)	2 (11.6%)	28 (9.3%)
	Widowed	3 (3.9%)	22 (9.8%)	25 (8.3%)
	Unmarried	1 (1.3%)	6 (2.7%)	7 (2.3%)
Presence of Health Professional as a family member	Yes	12(15.6%)	16(7.1%)	38(12.6%)
	No	65(84.4%)	208(92.9%)	263(87.4)

Nearly all male (92.2%) and three fourth of women respondents (75.9%) were married. In about one tenth (12.6%) of the surveyed households, there was at least one person in the family working in the health sector as a health professional (Table 2).

Chronic health conditions in the surveyed households

With regard to the prevalence of chronic conditions in the surveyed households, there were sixty six (21.9%) of households with members suffering from chronic diseases. These households reported one or more chronic diseases in one or more members of a family (maximum chronic diseases in a household were two diseases).

The most frequently reported chronic diseases were hypertension (33.3%), asthma (29.3%), HIV/AIDS (14.7%), diabetes mellitus (10.7%) and cardiac diseases (8.0%). Details of the common chronic diseases in surveyed households are shown in table 3.

Table 3: Chronic disease condition characteristics of respondents, Goba Town, South East Ethiopia, April, 2016.

Chronic Health Disease	Frequency	Percent
Hypertension	25	33.3
Asthma	22	29.3
HIV/AIDS	11	14.7
Diabetes mellitus	8	10.7
Cardiac	6	8.0
Dyslipidemia	1	1.3
Epilepsy	1	1.3
Rheumatoid	1	1.3
Total	75	100.0

Medicine use and medicine handling at home

As depicted in table 4, about one fifth (17.3%) of the respondents mentioned that they do not check the expiry date of medicine before its use. About four fifth (84.1%) of the respondents answered that they throw out the medicines left from past treatment. With regard to the type of disposal for leftover medicines, seventy four (24.6%) of the households dispose only expired medicines whereas the rest two hundred twenty seven (75.4%) dispose any left-over medicines either expired or unexpired.

Table 4: Medication use characteristics of respondents, Goba Town, South East Ethiopia, April, 2016.

Characteristics		Frequency	Percent
Custom to check the expiry date before use	Yes	249	82.7%
	No	52	17.3%
How do you deal with left-over (unused medicines)	Keep them	48	15.9%
	Return them to a pharmacy	0	0.0%
	Throw them	253	84.1%
Which medicines do you dispose	Expired medicines only	74	24.6%
	Both expired and unexpired medicine	227	75.4%

Prevalence of leftover medicine at home

Of the households visited, eighty two (27.2%) had stored leftover drugs. Altogether, there were ninety two leftover preparations. The average household possessed 1.12 products and the range was 1-3 per household.

With regard to different ages of household members who were used the medicines found leftover in the households; twenty two (26.8%), one (1.2%), fifty four (65.9%), and five (6.1%) of medicines were used by children (<12 years), adolescents (12-20 years), adults (21-60 years) and geriatrics (> 60 years), respectively.

Analgesics were the leading household leftover drugs (35.9%), followed by antibiotics (34.8%) (Table 5). These drugs constituted (70.7%) of the total drugs leftover.

Table 5: Group of medication found leftover, Goba Town, South East Ethiopia, April, 2016.

Medication	Frequency	Percent
Analgesics	33	35.9
Antibacterial	32	34.8
Antihypertensive	4	4.3
ARV	4	4.3
Antacids/GI	3	3.3
Antidiabetics	3	3.3
Antiprotozoal	3	3.3
Vitamin and Minerals	3	3.3
Anti Helementics	2	2.2
Antiepileptic	1	1.1
Antihistamine	1	1.1
Corticosteroids	1	1.1
Lipid Lowering	1	1.1
Oral Hormonal Contraceptives	1	1.1
Total	92	100.0

Dosage form of medicines kept in households is shown in figure 1, most (59%) of the medicines were available in the form of tablets, (18%), (13%), (8%) and (2%) capsule, liquid oral, injection and suppository respectively.

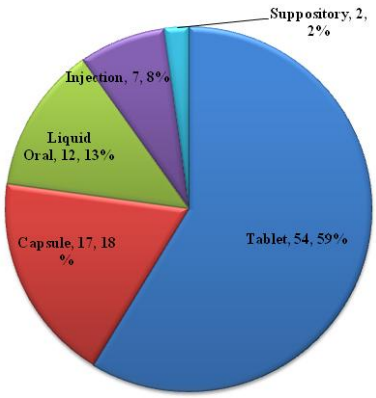

Fig. 1: Dosage form of medication found leftover, Goba Town, South East Ethiopia, April, 2016.

Concerning the source of leftover medicines, more than half (60.9%) of the left over medicine were from the community pharmacies, only one third (33.7%) of them were from the public health facilities and the remaining (5.4%) were obtained through borrowed from neighbors (Table 6).

Table 6: Source of leftover medication, Goba Town, South East Ethiopia, April, 2016.

Source of the leftover medication	Presence of leftover (unused) medication in home	
	Frequency	**Percent%**
Community Pharmacies	56	60.9%
Public Health Facility	31	33.7%
Borrowed	5	5.4%

As showed in figure 2, more than half of leftover medication, fifty nine (64.1%) were unused since the symptom had resolved.

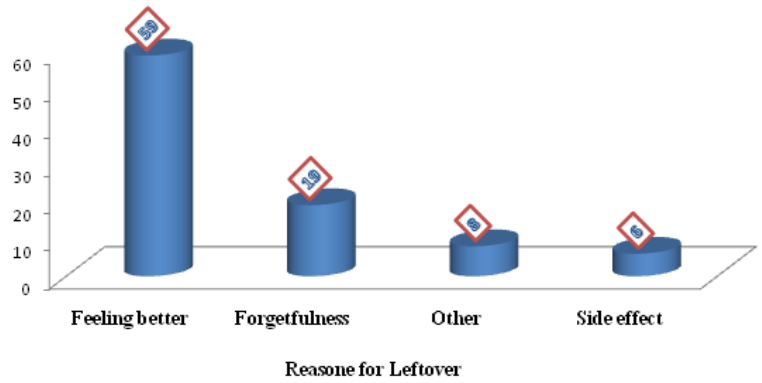

Fig. 2: Reason for medication leftover, Goba Town, South East Ethiopia, April, 2016.

Among the left over medications obtained at home twenty one (22.8%) were expired (Table 7).

Table 7: Expiry status of leftover medication, Goba town, South East Ethiopia, April, 2016.

Characteristics		Frequency	Percent
Expiry Date of the left over medication	Not Expired	71	77.1%
	Expired	21	22.8%

Predictors of leftover medication at home

The binary logistic regression result revealed that presence of leftover medicine in home was significantly associated with basic socio-demographic variables such as sex, educational status of the mother, educational status of the father, occupation and presence of health professional in the family also showed association.

Table 8 presents result from multivariable logistic regression analysis for predictors of leftover medicine at home. Housewives were 4.18 (95% CI: 1.96, 8.87) times more likely to report presence of leftover medicines in their households than those who had other occupation, presence of health professional as family member were 2.8 (95% CI: 1.11, 5.71) times more likely to have leftover medicine than families with no health professionals.

Table 8: Multivariate analysis for factors associated with leftover medication, Goba town, SouthEast Ethiopia, April, 2016.

Characteristics		Presence of leftover Medication		COR(95% CI) P value	AOR(95% CI) P value
		Yes, n (%)	No, n (%)		
Sex	Male	31(40.3%)	46(59.7%)	0.44 (0.25,0.76) 0.003	
	Female	51(22.8%)	173(77.2%)	1	
Educational status of the mother	Illiterate	6(14.6%)	35(85.4%)	4.58 (1.72,12.20) 0.002	
	Read and write	7(29.2%)	17(70.8%)	1.91 (0.71,5.14)	
	Primary Education	12(28.6%)	30(71.4%)	1.96 (0.87,4.41)	
	Secondary Education	23(20.0%)	92(80.0%)	3.14 (1.65,5.99) 0.001	
	Tertiary Education	33(44.0%)	42(56.0%)	1	
Educational status of the father	Illiterate	2(15.4%)	11(84.6%)	2.75 (0.59,12.92)	
	Read and write	2(22.2%)	7(77.8%)	1.75 (0.35,8.76)	
	Primary Education	7(30.4%)	16(69.6%)	1.14 (0.44,2.97)	
	Secondary Education	12(19.4%)	50(80.6%)	2.08 (1.01,4.28) 0.046	
	Tertiary Education	47(33.3%)	94(66.7%)	1	
Occupation	Farmer	6(46.2%)	7(53.8%)	1.03 (0.32,0.94)	
	House Wife	22(15.9%)	116(84.1%)	4.65 (2.46,8.76) 0.000	4.18 (1.96,8.87) 0.00
	Merchant	9(18.8%)	39(81.2%)	3.82 (1.63, 8.92) 0.002	
	Daily Laborer	4(28.6%)	10(71.4%)	2.20 (0.64,7.62)	
	Student	4(44.4%)	5(55.6%)	1.10 (0.28,4.41)	
	Government Employee	82(27.2%)	219(72.8%)	1	1
Presence of Health Professional in the family	Yes	18(64.3%)	10(35.7%)	1.70 (0.75,3.85) 0.000	2.80 (0.11,0.71) 0.01
	No	64(23.4%)	209(76.6%)	1	1

DISCUSSION

As this study assessed the burden of leftover medicine at home in Goba town, Bale Zone, Ethiopia, 27.2% of household had stored leftover drugs at home. This value seems to be more or less similar to the findings of the previous study done in Ethiopia 28%[7], and it is less prevalent as compared to the studies done elsewhere, 55.4%, 39.2%, 41.2% and 45% in Uganda, Indonesia, meta-analysis in developing countries and Iraq respectively [4,5,8,11]. The lower prevalence of home drug storage in Ethiopia could be attributed to the fact that substantial number of Ethiopians are relying on traditional medicine [12,13].

According to the finding of this study, more than half of the leftover medicine were stored at home since the compelling health condition were resolved and feeling better which leads to premature terminating the course of treatment. In addition, people may keep leftover drugs because of initial excessive prescribing for treatment, inadequate adherence to treatment and anticipated future use [11].

In this study, the most common medicines that were found as leftover in households included Analgesics (35.9%), followed by antibiotics (34.8%). This finding is in contrast with other similar study conducted in Sudan[14] but in line with studies conducted in Ethiopia elsewhere[7]. Particularly, the storage of antibiotics was reported in significant number of studies [15,11] including the present study. This has to be considered seriously because uncontrolled and excessive antibiotic use resulted from home drug storage could lead to antimicrobial drug resistance [7].

In this study, the major sources of leftover medicines kept in homes were from the community pharmacies 60.9%. This is in line with the findings of all the above mentioned studies [4,6,7,11].

Presence of health professional as a family member was significantly associated with home storage of drugs in the current study which is in line with other study conducted in Tigray region [7]. The other significant association with leftover medication according to this study was households with housewives; which is not congruent with any studies done earlier.

CONCLUSION

The prevalence of leftover medicine at home in Goba town was 27.2%. Analgesics and antibiotics were found to be the most commonly leftover drugs. Most drugs kept at home were not appropriately labeled or stored at a safe place and this may lead to inappropriate use of those drugs. Housewives with no formal job and the presence of health professional(s) in the households were found to be associated with drug storage at home.

RECOMMENDATIONS

Based on the results obtained and the conclusion drawn, the following recommendations are forwarded:-

- Appropriate educational campaign has to be in place to raise the awareness of the society on appropriate utilization of drugs, avoidance of leftover drugs, correct disposal of leftover drugs and harmful effects of consuming non-prescribed medication specially antibiotics.
- The government agencies have to execute their responsibility in order to improve the rational use of medicine both at community and public drug outlet by educating and updating the knowledge of professionals who have direct contact with the end users, or consumers.
- The regulatory body should also design policies and strategies for community pharmacies in order to collect leftover medicine from the households.

Conflict of interest

We, the authors, declare that there is no conflict of interest regarding this research theme and for its publication.

ACKNOWLEDGEMENTS

The authors would like to appreciate all staffs of the Pharmacy Department of Ambo University for their Technical Support. The authors would also like to thank Bale Zonal and Goba Town Health Offices, Management and staffs for their great help and support. In addition, we would like to extend our appreciation to all data collectors and study participants for their cooperation and provision of valuable information.

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